



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/580,422	05/24/2006	Anne-Marie Caminade	1004900-000276	1713

21839 7590 09/10/2009
BUCHANAN, INGERSOLL & ROONEY PC
POST OFFICE BOX 1404
ALEXANDRIA, VA 22313-1404

EXAMINER

DOLLINGER, MICHAEL M

ART UNIT	PAPER NUMBER
----------	--------------

1796

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

09/10/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ADIPFDD@bipc.com

Office Action Summary	Application No. 10/580,422	Applicant(s) CAMINADE ET AL.	
	Examiner MIKE DOLLINGER	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06/08/2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 60-79, 81-87 and 89-118 is/are pending in the application.
- 4a) Of the above claim(s) 92-118 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 81-87, 89-91 and 6079 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>06/08/2009</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

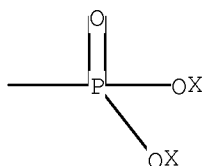
1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

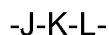
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 60-65, 67-76, 78, 79, 81-84 and 89 are rejected under 35 U.S.C. 102(b) as being anticipated by Caminade et al (WO 0053009, herein US 6,939,831 B1 is used as an English language equivalent).

3. Regarding claims 60 and 65, applicants claim a dendritic polymer of generation 0 to 12 with a central core molecule of valence 3 to 8, optionally generation chains branching around the core, intermediate chains, and terminal groups at the end of each intermediate chains of the formula:



wherein each of the radicals X, which are identical or different, represent a radical -Me, -H and/or -M⁺, wherein M⁺ is a cation. The intermediate chains which are identical or different, are represented by the formula:



wherein J represents an oxygen atom, a sulfur atom or a radical -NR-; K represents a radical -Aryl-, -Heteroaryl-, or -Alkyl- and most limited to an unsubstituted phenyl; L

Art Unit: 1796

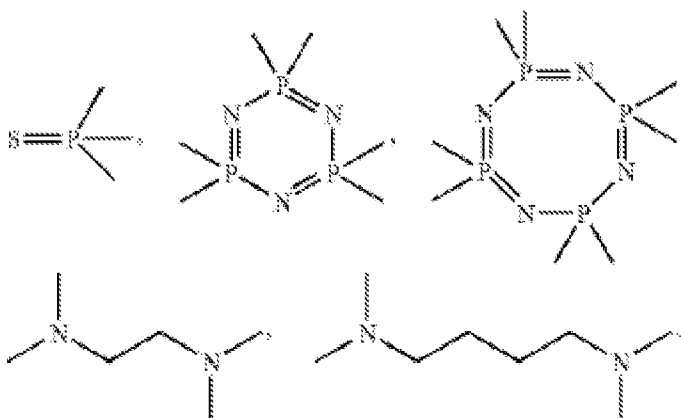
represents a hydrocarbon chain having from 1 to 6 chain members optionally having one or more heteroatoms, or by the formula:



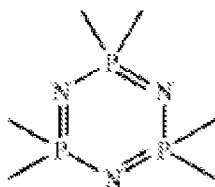
wherein L'' represents an -alkyl- chain having from 1 to 6 chain members, optionally substituted by one or more substituents selected from -OH, -NRR', and -Oalkyl-.

Caminade et al. disclose a dendritic polymer of one or more generations with core molecule of valence preferable between 3 and 10 (column 14 lines 43-48) wherein the core may be a hexachlorocyclotriphosphazene or trichlorothiophosphane (column 15 lines 1-4), generation and intermediate chains, and with phosphonic type terminal groups (column 13 lines 1-3). Caminade et al. disclose the structure in FIG. (XI) (column 38) having the same formula -J-K-L- above wherein J is an oxygen atom; K is a radical aryl namely a phenylene group; and L is a four membered hydrocarbon chain with N and P heteroatoms.

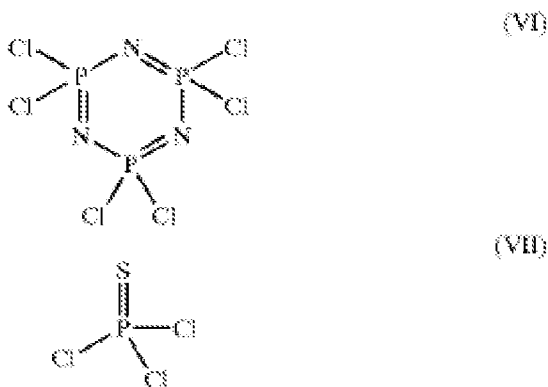
4. Regarding claims 61-63, applicants claim a dendritic polymer wherein the central core contains at least one phosphorous atom or is selected from the following groups:



preferably of the formula:



Caminade et al. disclose the central core of the dendritic polymer as hexachlorocyclotriphosphazene or trichlorothiophosphane (column 15 lines 1-4; Structures (VI) and (VII)):



5. Regarding claim 64, applicants claim a dendritic polymer having a DAB-AM, PAMAM, or PMMH structure. The structure in FIG. (XI), discussed above, reads on a PMMH structure, phenoxy methyl(methylhydrazono).
6. Regarding claim 67, applicants claim the dendritic polymer with 0 to 3 generations. Caminade et al. discloses intermediate products of dendrimers with 0 to 3 generations (column 5 lines 35-65).
7. Regarding claim 68, applicants claim the central core molecule of the dendritic polymer with a valence of 3, 4, or 6. Caminade et al. disclose the central core of the dendritic polymer as hexachlorocyclotriphosphazene which has a valence of 6 and trichlorothiophosphane which has a valence of 3.

Art Unit: 1796

8. Regarding claims 69-76, applicants claim generation branch compositions elected from linear or branched hydrocarbon chains having from 1 to 12 chain members wherein the generation chains are of the formula:



wherein in the most limited embodiments A represents an oxygen atom; B represents a substituted or unsubstituted phenyl ring; D represents a hydrogen atom; E represents a radical alkyl; and G represents a sulfur atom. Caminade et al. disclose the structure in FIG. (XI) (column 38) having the same formula as represented above wherein A is an oxygen atom; B is an aryl group namely phenylene; C is a carbon atom; D is an hydrogen atom; E is an alkyl radical namely methyl; and G is a sulfur atom.

9. Regarding claim 78, applicants claim the generation chains represented by the formula:



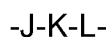
wherein A'' represents a radical -Alkyl, -Alkenyl, or -Alkynyl. Caminade et al. disclose generation chains composed of alkylamino groups (column 16 line 6).

10. Regarding claim 79, applicants claim the generation chains as identical. Caminade et al. disclose generation chains with chemical motifs that are in part identical to each other (column 15 lines 33-37) and the structure of FIG. (XI) discloses identical generation chains.

11. Regarding claim 81, applicants claim the intermediate and generation chains wherein J and K are equal to A and B. The same elements of Figure (XI) of Caminade et al. anticipate both J and K, and A and B.

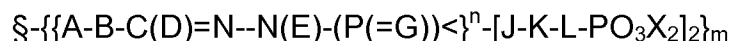
Art Unit: 1796

12. Regarding claims 82-84, applicants claim the intermediate chains, which are identical or different, as represented by the formula:



wherein J represents an oxygen atom, a sulfur atom or a radical -NR-; K represents a radical -Aryl-, -Heteroaryl-, or -Alkyl- and most limited to an unsubstituted phenyl; L represents a hydrocarbon chain having from 1 to 6 chain members optionally having one or more heteroatoms. Caminade et al. disclose the structure in FIG. (XI) (column 38) having the same formula as represented above wherein J is an oxygen atom; K is a radical aryl namely a phenylene group; and L is a four membered hydrocarbon chain with N and P heteroatoms.

13. Regarding claim 89, applicants claim a dendritic polymer with a core, generation and intermediate chains, and phosphonic terminals in the formula:



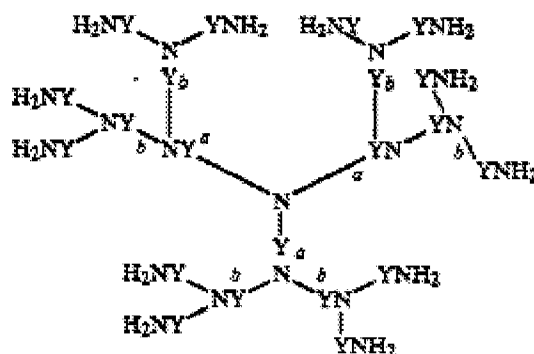
wherein all variables are as defined above. Caminade et al. disclose dendritic polymers with a core of hexachlorocyclotriphosphazene or trichlorothiophosphane (column 15 lines 1-4), generation or intermediate chains described in paragraphs 5 and 12 of this office action, and phosphonic terminals (column 13 lines 1-3).

14. The indicated allowability of claims 65, 66, 77, 85-87, 90 and 91 is withdrawn in view of the reference(s) to Killat et al (US 4,871,779) and Caminade et al (FR 2734268 A1) hereinafter referred to as Caminade '268. Rejections based on the newly cited reference(s) follow.

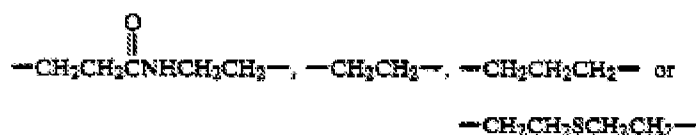
15. Claims 60, 62, 64-69, 77-79, 85-87, 90 and 91 are rejected under 35

U.S.C. 102(b) as being anticipated by Killat et al (US 4,871,779).

16. Killat et al. disclose dense star polymers (column 2 lines 26-27) with at least one dendritic branch (column 2 line 27), at least two terminal ion exchange moieties on each dendritic branch (column 2 lines 28-29) that is preferably phosphonate or phosphonium (column 6 lines 58-61). Before adding the terminal groups, the dendrimers have the structure:



wherein Y represents a divalent amide moiety such as



The above dendritic polymers may have a PAMAM (polyamidoamine) structure (the leftmost moiety for Y), a ternary or trivalent core molecule, and second generation dendritic branches (column 10 lines 15-18). The phosphonic terminals can be added through the direct reaction of the ---NH_2 ends of the dendrons with chloromethylphosphonate (column 7 lines 19-24). This dendritic polymer would have a

Art Unit: 1796

core valence of 3 or 4 and a generation of 2. The nitrogen atoms at the end of each generation chain may also be substituted with a hydrogen atom [claim 17; column 22 lines 2, 9].

17. Regarding claims 65 and 66, the phosphonate groups are used as ion exchange groups [column 6 lines 58-61]. The terminal anionic groups (phosphonic groups) of the cation exchange dendrimers are neutralized with stoichiometric amounts of alkali metal hydroxide [column 5 lines 55-58] which results in a phosphonate group with an alkali metal cation. The alkali metal hydroxide used in the examples is sodium hydroxide [Example 8]. Furthermore, one having ordinary skill in the art would have immediately envisaged sodium hydroxide, potassium hydroxide and all other alkali metal hydroxides from the disclosure of "alkali metal hydroxide".

18. Regarding the structure of 90, this polymer (with the leftmost Y moiety above and a hydrogen atom on the nitrogens) would have the structure wherein A' is ethylene, B' is ethylene, R is hydrogen, L" is methylene, and X is H or an alkali metal cation.

19. Regarding the structure of claim 91, this polymer (with one of the alkylene groups as the Y moiety above and a hydrogen atom on the nitrogens) would have the structure wherein A" is an ethylene or propylene, L" is a methylene and X is H or an alkali metal cation.

20. Regarding claim 62, the core of the dendrimer may be ethylene diamine or butylene diamine [claim 18; column 22 lines 18-29].

Art Unit: 1796

21. Claims 60-65, 68-76, 79, 81-84 and 89 are rejected under 35 U.S.C. 102(b) as being anticipated by Caminade et al (FR 2734268 A1) hereinafter referred to as Caminade '268.

22. Caminade '268 discloses, in Examples 4-6, 11 and 12, several dendrimers with phosphonic terminals. The Examples include 10-generational [Examples 4-6] and 4-generational [Examples 11 and 12] with PMMH generational chains [Figures 1 and 2]. The ultimate generation reads on the intermediate chains of the claims. The PMMH chains read on the generational chains of claims 69-76 wherein A represents an oxygen atom, B represents a phenyl radical, D represents a hydrogen atoms, E represents a methyl radical, and G represents a sulfur radical [Figures 1 and 2; page 24 lines 13]. The core molecule is $S=P\equiv$ radical [page 24 lines 6-9]. Caminade '268 discloses that the core molecule may be derived from $O=PCl_3$, $S=PCl_3$ or $P_3N_3Cl_6$ [page 15 lines 23-26] which reads on the core molecule of claim 63.

23. Regarding claims 69-76, applicants claim generation branch compositions elected from linear or branched hydrocarbon chains having from 1 to 12 chain members wherein the generation chains are of the formula:

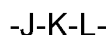


wherein in the most limited embodiments A represents an oxygen atom; B represents a substituted or unsubstituted phenyl ring; D represents a hydrogen atom; E represents a radical alkyl; and G represents a sulfur atom. Caminade'268 disclose the structure [Figures 1, 2, 6 and 13] having the same formula as represented above wherein A is an

Art Unit: 1796

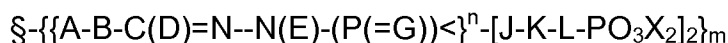
oxygen atom; B is an aryl group namely phenylene; C is a carbon atom; D is an hydrogen atom; E is an alkyl radical namely methyl; and G is a sulfur atom.

24. Regarding claims 81-84, applicants claim the intermediate chains, which are identical or different, as represented by the formula:



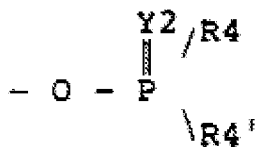
wherein J represents an oxygen atom, a sulfur atom or a radical -NR-; K represents a radical -Aryl-, -Heteroaryl-, or -Alkyl- and most limited to an unsubstituted phenyl; L represents a hydrocarbon chain having from 1 to 6 chain members optionally having one or more heteroatoms. Caminade '268 disclose the structure in FIG. (XI) (column 38) having the same formula as represented above wherein J is an oxygen atom; K is a radical aryl namely a phenylene group; and L is a four membered hydrocarbon chain with N and P heteroatoms.

25. Regarding claim 89, applicants claim a dendritic polymer with a core, generation and intermediate chains, and phosphonic terminals in the formula:



wherein all variables are as defined above. Caminade '268 disclose dendritic polymers with a core of hexachlorocyclotriphosphazene or trichlorothiophosphane [page 15 lines 23-26] generation or intermediate chains described in paragraphs 22 and 23 of this office action, and phosphonic terminals.

26. Regarding the terminal groups, Caminade '268 discloses terminal groups of the formula:



[page 49 lines 12-15]

wherein Y2 includes oxygen [page 50 line 11] and R4 and R4' include hydroxyl groups [page 50 lines 4-5].

Response to Arguments and Declaration

27. Applicant's arguments filed 06/08/2009 have been fully considered but they are not persuasive. Applicants argue and declare that the phosphonic terminals disclosed by Caminade et al cannot be of the formula $-\text{P}(=\text{O})(\text{OX})_2$ wherein X is -Me, -H or $-\text{M}^+$, as required by the claims. Applicants argue that the only phosphonic type terminal groups at the time of the Caminade et al reference were disclosed in Prevote (previously of record) and that only $-\text{P}(=\text{O})(\text{OEt})_2$ groups were known. This argument is not convincing because Killat et al, discussed above, disclose dendrimers with $-\text{P}(=\text{O})(\text{OH})_2$ and $-\text{P}(=\text{O})(\text{OM}^+)_2$ groups, wherein M^+ is an alkali metal. Killat et al predates Caminade et al by 11 years and would be well known to one of ordinary skill in the art.

28. Applicants also argue that one having ordinary skill in the art would have interpreted the phosphonic terminal dendrimers of Caminade et al to be those dendrimers of Prevote comprising $-\text{P}(=\text{O})(\text{OEt})_2$ terminal groups. This argument is not convincing. The skilled reader would have interpreted "phosphonic" as $-\text{P}(=\text{O})(\text{OH})_2$ groups. Then having looked at the relevant prior art, which would include Killat et al, the skill artisan would be taught how to make such groups.

Art Unit: 1796

29. Applicants' arguments could be interpreted as trying to show that Caminade et al is inoperable; that Caminade et al disclosed "phosphonic groups" meaning $P(=O)(OH)_2$ groups but that the chemistry for preparing these groups was not known (see Applicants' arguments paragraph 8.). This is also refuted by the teachings of Killat et al, which would direct one of ordinary skill in the art to make $-P(=O)(OH)_2$ or $-P(=O)(OM^+)_2$ groups.

30. Furthermore, Applicants' attention is drawn to the high burden for showing that the prior art is not inoperable: The prior art is presumed to be operable and enabling; when the reference relied on expressly anticipates or makes obvious all of the elements of the claimed invention, the reference is presumed to be operable. Once such a reference is found, the burden is on applicant to provide facts rebutting the presumption of operability. *In re Sasse*, 629 F.2d 675, 207 USPQ 107 (CCPA 1980). Since every patent is presumed valid (35 U.S.C. 282), and since that presumption includes the presumption of operability (*Metropolitan Eng. Co. v. Coe*, 78 F.2d 199, 25 USPQ 216 (D.C.Cir. 1935), examiners should not express any opinion on the operability of a patent. **Affidavits or declarations attacking the operability of a patent cited as a reference must rebut the presumption of operability by a preponderance of the evidence.** *In re Sasse*, 629 F.2d 675, 207 USPQ 107 (CCPA 1980). Further, since in a patent it is presumed that a process if used by one skilled in the art will produce the product or result described therein, such presumption is not overcome by a mere showing that it is possible to operate within the disclosure without obtaining the alleged product. *In re Weber*, 405 F.2d 1403, 160 USPQ 549 (CCPA 1969). It is to be

Art Unit: 1796

presumed also that skilled workers would as a matter of course, if they do not immediately obtain desired results, make certain experiments and adaptations, within the skill of the competent worker. The failures of experimenters who have no interest in succeeding should not be accorded great weight. *In re Michalek*, 162 F.2d 229, 74 USPQ 107 (CCPA 1947); *In re Reid*, 179 F.2d 998, 84 USPQ 478 (CCPA 1950).

Where the affidavit or declaration presented asserts inoperability in features of the reference which are not relied upon, the reference is still effective as to other features which are operative. *In re Shepherd*, 172 F.2d 560, 80 USPQ 495 (CCPA 1949).

Where the affidavit or declaration presented asserts that the reference relied upon is inoperative, the claims represented by applicant must distinguish from the alleged inoperative reference disclosure. *In re Crosby*, 157 F.2d 198, 71 USPQ 73 (CCPA 1946). See also *In re Epstein*, 32 F.3d 1559, 31 USPQ2d 1817 (Fed. Cir. 1994).

31. In particular, Applicants should be aware of the following case law: **If a patent teaches or suggests the claimed invention, an affidavit or declaration by patentee that he or she did not intend the disclosed invention to be used as claimed by applicant is immaterial.** *In re Pio*, 217 F.2d 956, 104 USPQ 177 (CCPA 1954).

Compare *In re Yale*, 434 F.2d 66, 168 USPQ 46 (CCPA 1970). See MPEP § 716.07 and 2121 [R-6] I.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MIKE DOLLINGER whose telephone number is (571)270-5464. The examiner can normally be reached on M-F 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/mmd/

/Randy Gulakowski/
Supervisory Patent Examiner, Art Unit 1796